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COMPOSTING CONTAMINATION IN CORPORATE SETTINGS

PREPARED FOR:
HENNEPIN COUNTY'S ENVIRONMENT AND ENERGY DIVISION

BY: LAURA CINA, MOLLY GEZELLA-BARANCZYK, & MICHAEL WEDL

Capstone Instructor: Diana Beck

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Table of Contents **Page**

Executive Summary

The following is a comprehensive overview compiled for Hennepin County's Environment and Energy Division to address compost contamination in corporate settings. Contamination consists of non-compostable materials in the compostable collection. Contamination may include items such as plastics bottles, cups, plastic flatware, coated paper, or plastic bags. This contamination leads to higher costs to the county, corporate participants, and others in the compost processing chain. Costs are incurred when deliveries of recyclable organics are rejected due to contamination above the allowable threshold. Research will be aimed at finding reasons for contamination, understanding alternative practices, and behavior modification strategies to improving organics sorting among participants. The results consist of a series of recommended actions and considerations to best facilitate behavior change and reduce contamination to compost in corporate settings.

Organizational Overview

Hennepin County is the largest populated county in the state of Minnesota. As a metropolitan county Hennepin County adheres to the state's Metropolitan Solid Waste Management Policy Plan, which sets the framework for solid waste management through 2036. This policy includes plans to increase organics recovery to 15% by 2036 and reach the state goal of recycling 75% of waste by 2030. (*Hennepin County Solid Waste Master Plan 2018*). Hennepin County licensed haulers offer organics recycling (also referred to as composting) in some residential areas, as well as commercial settings. While participating in organics recycling programs is currently voluntary, the County plans to move forward to revise Ordinance 13, and require corporate office parks with food service to participate in organics recycling by 2020. Those in corporate settings who have voluntarily opted into organic recycling are experiencing a range of challenges with contamination.

Contamination equates to non-organic materials present in the organics recycling batch. When contamination exceeds 10% of a load, it requires that the entire batch be redirected to trash; which is then taken to landfill or incinerated. According to Hennepin County, contamination has become a frustration as the composting sites available cannot accept the high levels of contamination currently seen in the organics loads. Many loads are rejected and redesignated

as trash, and it is not always possible to follow up with businesses as many haulers pick-up from multiple businesses in one load.

As Hennepin County looks towards the future of composting in more corporate office parks, with their pending mandate to begin in 2020, they seek to reduce composting contamination.

Methodology

Our research methodology required gathering and analyzing data, opinions and processes to assist in gaining a better understanding of the problem in order to make appropriate recommendations to Hennepin County. The literature we researched included behavior change models, as well as strategic planning implementation. Research on this topic was widespread and we were able integrate the various models we found into our suggestions to Hennepin County.

To understand corporate users knowledge about what to compost and how they think and feel about their current composting program, the Capstone Team designed and distributed two surveys, one for employees and one for management. Surveys were sent, by email, to the four participating corporations in Hennepin County for distribution to employees. In addition to surveys, the Capstone Team visited sites where organics recycling was happening. On these corporate site visits we were able to witness firsthand some of the potential roadblocks; as well as best practices in action. In addition, the Capstone Team utilized aspects of Design Thinking to help guide our recommendations. Through this process we hoped to “understand the user, challenge assumptions, and redefine problems in an attempt to identify alternative strategies and solutions that might not be instantly apparent with our initial level of understanding.” (Dam, R. and Siang, T., 2017)

Combining research, observation, survey, and interviews the Capstone Team was able to prototype and recommend several opportunities for Hennepin County to consider as they move forward with their organics recycling initiative.

Data Collection

Site Tours

The following four Hennepin County corporations had site visits by the Capstone Team:

- Tennant Company-toured October 10, 2017
- Allianz-toured October 13, 2017
- DQ International-toured October 17, 2017
- General Mills-toured October 24, 2017

Hennepin County recommended these sites for the Capstone Team to visit, at this time we do not have any data on success rates at these sites. Each corporate campus visited provided insights into the different user experiences navigating organics recycling within Hennepin County. For each tour a Hennepin County client representative and Capstone Team representative met with an implementation representative from the corporation visited. All corporations visited are currently participating in organics recycling in Hennepin County and contract with a Hauler to facilitate organics recycling.

At each site visit the Capstone Team member observed the cafeteria, break rooms, office suites, general public spaces, and loading docks where dumpster and compactor bins are stored. In addition to observations made in these areas, clarifying questions were asked to assess the corporation's goals for the program and understand various user experiences.

Corporate User Surveys

One of the primary research methods used in this study was user surveys. This study looked at why those involved in the Organics Recycling Program were having problems sorting out what items may be composted, and which may not. Surveys may be used to measure human behavior and/or causes of human behavior, the survey methodology is an ideal way to determine reasons as to why participants may be contaminating the compost waste stream. Two surveys were used to gain data from subjects who had varying viewpoints on the topic. The first group surveyed were employees of corporations involved in the organics recycling program. The goal of measuring this group was to assess their satisfaction with training that may, or may not, have been implemented. Questions focused on how these users view various aspects of the program, which gave the research team insight into how participants feel they had been prepared for participation.

The second survey group was restricted to upper management staff from participating corporations; for the purpose of this survey management team refers to those who were directly, or indirectly, involved in the corporation's implementation of organics recycling . The Capstone Team looked to gain management's perspective on many of the same issues as the employee group, from a differing viewpoint. Management was viewed as decision makers who coordinated with Hennepin County on training, signage, or other material aimed at educating employees in the proper ways to sort organics at their corporation.

Data received from these groups was analyzed in order to help understand users related to: training received, possible mindsets of the participants, and usefulness of materials provided by the county. Analysis of the survey responses by the Capstone Team informed many of the final recommendations for changes to implementation techniques that may lessen contamination of compostable material in the future.

Literature Review

This literature review examines various components of the problem space and ideated recommendations related to composting, strategic planning implementation, behavior change, and education campaigning. Hennepin County's presenting concern relates to businesses sending in compost that is contaminated with non-compostable items. While the Capstone Team did not identify research outlining successful composting programs in office settings; research on behavior change in corporate environments, as well as the psychology of training and the impact of signage on learning were available in the literature.

While no literature specifically on compost contamination in corporate settings was identified, some literature was found on composting programs. Literature on composting programs suggested establishing a Green Team to organize employee efforts. Green Teams have been used to implement organics recycling best practices, such as: staffed bins in the cafeterias during lunch hours (Hottle, Bilec, Brown, & Landis, 2015), creating department competitions, or online quizzes with rewards for high scoring participants (A Guide to Composting in the Workplace).

Larger companies may hire individuals to form a leadership team, while smaller companies may ask passionate employees to volunteer to join their Green Teams. In either case, these leaders could be considered the "champions of the cause". In our context we see both Hennepin County and individual corporations as needing champions to achieve the goals of Minnesota's Metropolitan Solid Waste Management Policy and reduce compost contamination at user sites. The theme of championship was underscored in the text Strategic Planning for Public and Nonprofit Organizations (Bryson, 2011). Championship, supported by fostering collective leadership for the plan initiatives, incorporates leadership with followership to bring people together for "collective achievement" (Bryson, 2011).

Literature on how to influence employee behavior change in corporate settings was extensive.The strongest theme of the literature stressed the importance of gaining employee buy-in. Literature studied strongly suggests that employees be involved in planning of a program from the onset.. Literature stressed that change in corporate settings needed to come from the bottom up, even if the direction, comes from the top. (Ramus & Steger, 2000) This type of

empowerment gives employees the freedom to discover the best approach to achieve objectives. Leaving the program design to the employees not only creates employee buy-in and education in the process; this tactic will also create a program which is tailor-made to the specific company since most companies vary by size, layout, eating spaces, cleaning services, age, education and turnover levels.

According to the literature using clear and consistent communication could be the single most important tool that any company can take to promote a positive climate during change, regardless of whom directs the program changes. The anxiety that accompanies change results primarily from uncertainty (Murray, 2000). This uncertainty could result in employees putting everything in the compost bin (creating contamination) or putting everything in the trash can (reducing participation). Use of simple messages repeatedly, in multi-channel and multi-touch communications, is the prescribed method for successful programs.

Literature on behavior change also discussed various implementation methods for change, such as training. There are some common themes in the literature when approaching the idea of training, for example, employees tend to prefer e-learning better than in-person trainings (Strother,2002). Signs were also found as a way to reinforce or change a behavior and are observed continuously in our society; while some signs use words to give direction, many signs use symbols combined with a few words to remind the user of the desired behavior. Signs work best when the desired behavior has been previously learned so the sign simply triggers the desired response. Studies show that signs do not work well for teaching the desired behavior. Little research has been done on “why” signs work in the psychological sense, only that they do work (Meis J, Kashima Y, 2017).

While an effort was made to concentrate on topics as they related to corporate settings literature on the general education of the public was also considered. Literature finds many successful public education programs, largely around health related issues such as AIDS or cigarette smoking. There have also been many public education campaigns related to recycling. Comparison studies of similar towns in England have shown there are two common factors to marketing successful recycling programs and those are: consistent, concise messaging and frequent literature distribution (Robinson & Read, 2005).

Analysis

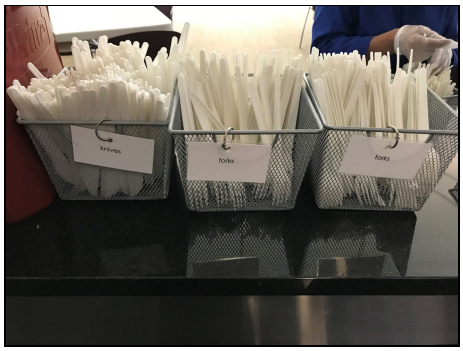
Site Visit Observation Analysis

Similarities seen in each corporate setting toured included individualized signage, color coding of receptacles to match signage, on-site cafeteria, occasional use of compostable utensils and containers and receptacle grouping in main areas. Additionally, each corporation held multiple corporate office buildings and locations on a national, and global level. Allianz noted that their sister headquarters in Germany was a leading force in requiring organics recycling and waste reduction efforts at their company. Similarly, Tennant Company and DQ International described international corporate locations as leading the U.S. locations in composting and recycling efforts.

Observed Signage

Each corporation toured had different types of signage; this signage was placed in various locations around receptacles. No signage was observed in any locations not adjacent to receptacles. While each location had signage design criteria mandated by their corporation, each used a combination of pictures and text to educate users. No color coding of bins or signage had been mandated by either Hennepin County or the Corporation. Yet, each location independently choose to use blue signage to indicate mixed recycling and green for composting bins. Trash bins were observed to be either red or black signage. When asked why the colors were chosen as observed, 3 out of 4 tour guides expressed that the blue for recycling and green for compost felt natural to users and that the color for trash waste was arbitrary. Only General Mills noted that they choose black for trash waste signage. This color choice was because they use red signage to indicate Terracycle recycling (wrapper recycling), which is the color the Terracycle program chose.

There was an absence of signage at user pickup or purchasing areas for food and utensils. There is an opportunity to provide more information to users by adding signage to purchase and pick up areas. Confusion at the receptacle could be reduced by providing more information to the user on which items are recyclable or compostable throughout the workplace.



Overall, signage was placed at various heights depending on the bin type used by the company. Signage that was placed at knee level were observed to be challenging to read. DQ International did not have wall signage and opted to create their own bin attachments for signage to achieve eye level placement. Their bins were primarily in stands on wheels and the sign could then remain with bins at eye level.

Sign images of compostable, recyclable, and items for landfill had been made by corporation staff independent, or in joint effort with, Hennepin County.

Observed Receptacle Placement and Liners

Of the sites visited 3 out 4 choose to implement removal of desk side waste receptacles at the time of organics recycling implementation. This choice was made to encourage staff to sort waste properly, as well as reduce potential confusion for janitorial staff when merging waste during evening pick up. The site that has not removed desk side waste was the newest implementer of organics recycling program at their corporation and noted that it was a short term goal to remove desk side waste.

All organics recycling receptacles observed were found grouped with other waste or recycling receptacles. These receptacles were observed in cafeteria areas, staff break spaces, and in large staff gathering areas or pass thru spaces.

Tennant was the only corporation who intentionally had different liner colors for each type of receptacle. They also had the green liners for compostable waste, but used gray liners for trash and clear liners for recycling. Liner color coding was observed to be misused in one area toured. It is unclear if the liner color coding aids in reduction of contamination by janitorial staff when merging office waste at dumpsters.

Pests

No site toured was observed to have issues with fruit flies or other pests associated with composting activity. When questioned about odor or pests associated with compost collection

none of the staff present at the tour noted either odor or pests as a deterrent to compost collection at their corporation. All corporations also noted that all waste was collected from receptacles daily and removed to dumpster/loading dock areas. All corporations had Haulers pick up compost dumpsters, or compactors, three times per week.

Back of House Earlier Implementation

All corporations toured expressed that they had begun composting in areas described as "back of house" for several years before implementing composting in general staff areas. Back of house areas were described as, for example, third party catering companies who manage cafeteria food preparation, research and development departments, and on-site daycare facilities. These areas of the building reported long term implementation with extremely low reports of contamination of compost or mixed recycling. Back of house areas observed on tours had limited signage, it was noted that waste sorting for composting was part of the staff training in these areas; or was part of the culture of that area (ie. food prep workplace norms).

Implementation team

Each corporation had various implementation and oversight to manage composting efforts at their location. Some corporations had sustainability goals that drove composting participation and in those circumstances also had paid staff positions associated with maintaining company wide sustainability overseeing composting efforts. Other corporations had staff oversight through Green Team type committees. Challenges with educating staff were expressed by implementation members accessible during site tours. These challenges came from lack of allowable signage, restrictions in communications from Human Resources departments, reduced participation by Green Team members over time, or lack of financial resources to implement changes or additions to the recycling program efforts.

Janitorial Staff

While all of the corporations toured had janitorial staff that removed compost, recycling, and waste to collection dumpsters none of them noted providing training to janitorial staff when composting participation began. Janitorial staff was not specifically noted as a potential source of contamination by anyone questioned. No janitorial staff were observed during site tours.

Persona Analysis

Design thinking elements, such as developing user personas, allowed the Capstone Team to better understand the various users of the corporations visited. These corporations expressed a wide variety of users of their internal program, ranging from staff to on-site contractors, short term visitors and transferred employees. In order to empathize with these different users and understand how they used the composting initiatives as corporations the Capstone Team engaged a wide variety of users in short interviews and merged those interviews with observations to build personas for a few of the users in the system. These user personas allowed the team to see the variety of motivations and challenges users experience when they encounter composting.

Corporate user personas developed by Capstone Team included:

- Corporate Manager (Sharon Right)
- Implementation Manager-Sustainability team (Mary Davidson)
- Janitorial staff (Steve Johnson)
- Temporary worker (Jessica Frank)
- Green Team volunteer (Raymond Jones)

Sharon Right

Sharon is a 56 year old corporate manager that has been with the same company in Hennepin County for the last 17 years. Sharon has her Masters in Business and is married with two teenager children living in Corcoran, MN, a small town within Hennepin County.

Career Goals

- Employee retention
- Achieving financial objectives
- Growing the customer base

Experience with Composting

Corcoran does not have a composting program, they do however have a single stream recycling program so no sorting is necessary.

She applauds the efforts and does compost when a bin is easily accessible but does not think very much about it. Sharon has attended a composting training and feels confident she knows how to compost correctly, she does not however have much confidence that her employees are composting correctly.

Jessica Frank

Jessica is a 26 year old single mother that grew up in North St Paul in a foster home. Her highest level of education is high school. She is currently working for a temp agency that sends her to a new company frequently to do basic office work. Jessica lives in St Paul but travels to work in Hennepin County often for short term employment through her agency.

Composting experience

Jessica has a good heart and morally wants to do what she can to save the environment or as she says, "save the polar bears". She thinks landfills are terrible and that we are running out of land to put garbage. Therefore, Jessica recycles and composts pretty much everything, wherever she may be. She does not, however, have a very good idea of what is compostable or recyclable. Jessica does her best to follow the signs to sort recycling and compost from trash.

"She is currently working for a temp agency that sends her to a new company frequently..."

"...he learned of a new initiative at Corporation Y to increase recycling efforts at the building he works in. Raymond is a millennial and doesn't understand why this wasn't something that Corporation Y had been doing religiously for years already"

Raymond Jones

Raymond grew up on farm in Minnesota and has always known the value of re-use. Raymond took a job at Corporation Y last year after graduating from the University of Iowa. Raymond enjoys living in the Twin Cities and is excited to have begun his career as an accountant at Corporation Y. When Raymond was hired he learned of a new initiative at Corporation Y to increase recycling efforts at the building her works in. Raymond is a millennial and doesn't understand why this wasn't something that Corporation Y had been doing religiously for years already. Raymond hopes to make a good impression, and meet new colleagues at Corporation Y by joining the Green Team in his office.

Goals for career

Raymond want to excel at his role as Accountant to get his career off to a good start. Raymond knows Corporation Y is a large company with opportunities for advancement. As a new employee Raymond is excited to being his role and is hopeful he will be able earn enough to afford his desired lifestyle in Minneapolis.

Steve Johnson

Steve grew up in Minneapolis and is a student second year at Normandale Community College. He goes to school full time while also working full time as a janitor at a Minneapolis based corporate campus. Finding employment where he could work evenings was ideal for Steve, so he could attend school and study during the day. While he takes pride in his work, he sees his current job simply as a way to pay for school. In his free time he plays guitar for a cover band and enjoys writing music.

Work experience

While he has been informed of the composting program at the campus he works at. His role is to remove trash, recycling, and compost bags from bins located on the office's third floor. This role is easy to Steve to manage and allows him to listen to books while he works so he maximize his study time.

"While he takes pride in his work, he sees his current job simply as a way to pay for school."

"Mary has a young family and finds personal value in preserving the environment for the future."

Mary Davidson

Mary has her Master's Degree in Engineering from the University of Minnesota and has enjoyed a long career at Corporation X. She has moved from various roles within Corporation X and has gained deep insights into their business operations and manufacturing. Mary has a young family and finds personal value in preserving the environment for the future. Mary's Corporation has headquarters in other countries and hears of sustainability initiatives outside of the manufacturing floor she is interested in implementing. She is in her first year on the Sustainability team and is hoping to help Corporation X save resources through her sustainability initiatives her team implements.

GOALS

Mary's goal with Corporation X is to create efficiencies in manufacturing while also reusing as much material as possible. Mary knows that her Corporation will not continue to invest in initiatives that her team implements if they do not save on resources or create earnings for the company long term. Through her position at Corporation X she can leverage resources to create changes on various levels of the company. By leveraging her positions Mary hopes to meet her goal of reducing waste from her Corporation by 20% each year, hoping to reach zero waste by 2025. With the new composting program, she is excited to see her Corporation's invest in PLA, or other compostable service ware, in all break and cafeteria areas. Her goal is all cafeteria and office areas will recycle all waste within the next 2 years.

Mother

Master's Degree

Survey Analysis

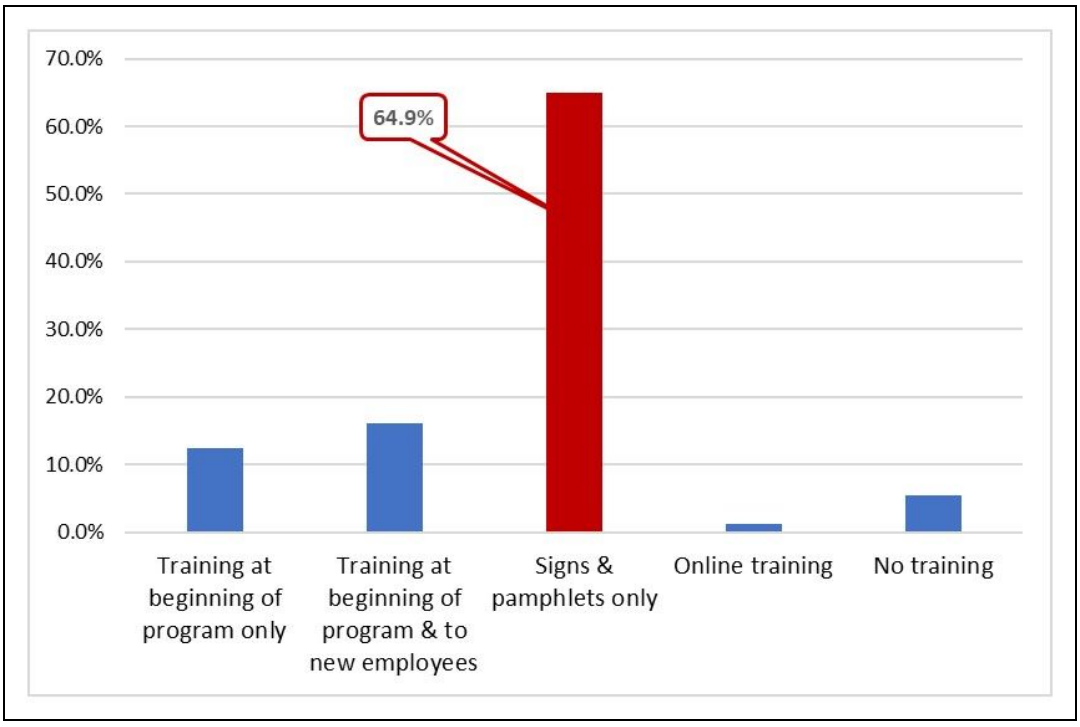
As previously discussed, we used surveys as a primary research method in order to gain insight from actual participant stakeholders in the Hennepin County organics recycling program. We used two separate surveys to gain insight both from the management team involved with implementation and administration of the program and from employees who may or may not participate in recycling in the workplace. While both surveys were very similar (See the actual surveys in the appendix), the management survey also had questions involving the management's perspective on the participation level and quality of participation within their various organizations.

Participants in the survey were given up to 4 weeks to take it and the results provided a diverse peek into the various opinions and habits of the participants. In total, 61 participants from the employee group and 12 participants from the management group completed the survey. A number of questions were specifically designed to demonstrate the level of conceptual familiarity there is in regard to recycling and composting in order to take criteria such as not knowing what recycling is and general participation rates out of the overall equation. It should be noted that there is likely a correlation between those who completed the survey and those who are most familiar with the practice of recycling. We still feel, however, that these participants provided us valuable insight, which will be discussed in the following section.

In the beginning of the survey we asked about the participants knowledge of composting to determine if they understood what the term”composting” meant. This is an important first step, if the people taking the quiz did not know what composting was then education would be an even more important factor, however only 1 out of 61 employees did not know what composting was. We then asked a question of language. The team had noticed both the terms composting and organics recycling were being used on signage and in educational literature. The team was curious if both terms were widely known to the participants. Turns out they are not equally familiar, 15% of the participants did not know what organics recycling was.

Survey Signage Analysis

Based on our initial research, interviews and observations, we had a concern about how signs that are meant to show what materials can, and cannot, go into bins were being perceived by participants in the program. A common thread found was that signs were often confusing, and in at least one case, (restaurant observation image 1 & 2) it was the signs that were likely a major impetus in the contamination occurring at the specific location. Our survey results, from both employee and management groups, indicated that signs were the primary method of the training they received. In fact, 38% of the management participants indicated that signs alone made up the training for their specific location, and 65% of the employee participants indicated that signs and pamphlets were the only training available to them. In other words, the signs were all the training the majority of the participants had.



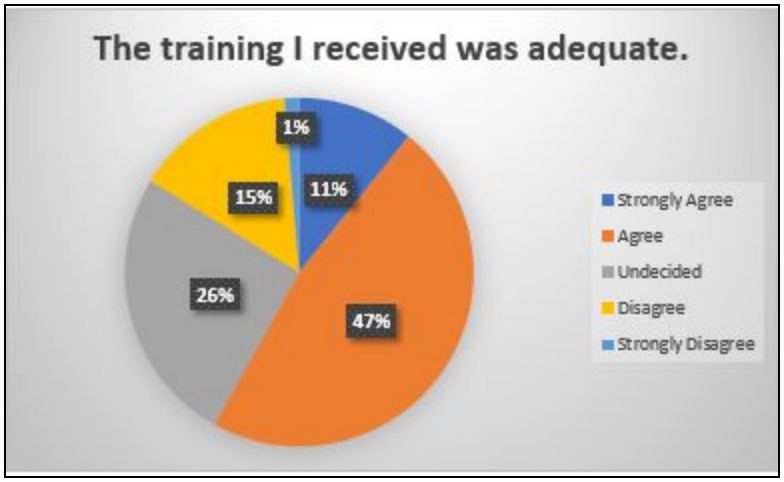
The employee survey indicated that of the locations where signs were the predominant training method, 35% of those surveyed said they were “Very Confident” that they were sorting their recycling correctly, while an additional 52% said they were “Somewhat Confident” they were sorting correctly. Therefore the vast majority of those who completed the survey feel, at least to some degree, that they were sorting organics correctly. Because, as we stated, the predominant

training methods are signs, it would be logical to infer that the signage being used is both clear and adequate. This being said, the level of uncertainty indicated by the word “Somewhat” reveals that there is likely a need for better/less confusing signage that leaves the participant with little room for error. When we consider that only 35% of the participants are “Very Confident”, we can see that the remaining 65% could use anywhere from a little more clarity to a lot more clarity as to what can and cannot go into each bin.

Finally, in the comment sections of the survey, both employees and management participants indicated that signs were possibly confusing and that less confusing signs would not only prevent some of the contamination problem, but would even help to increase the percentage of those who participate in recycling.

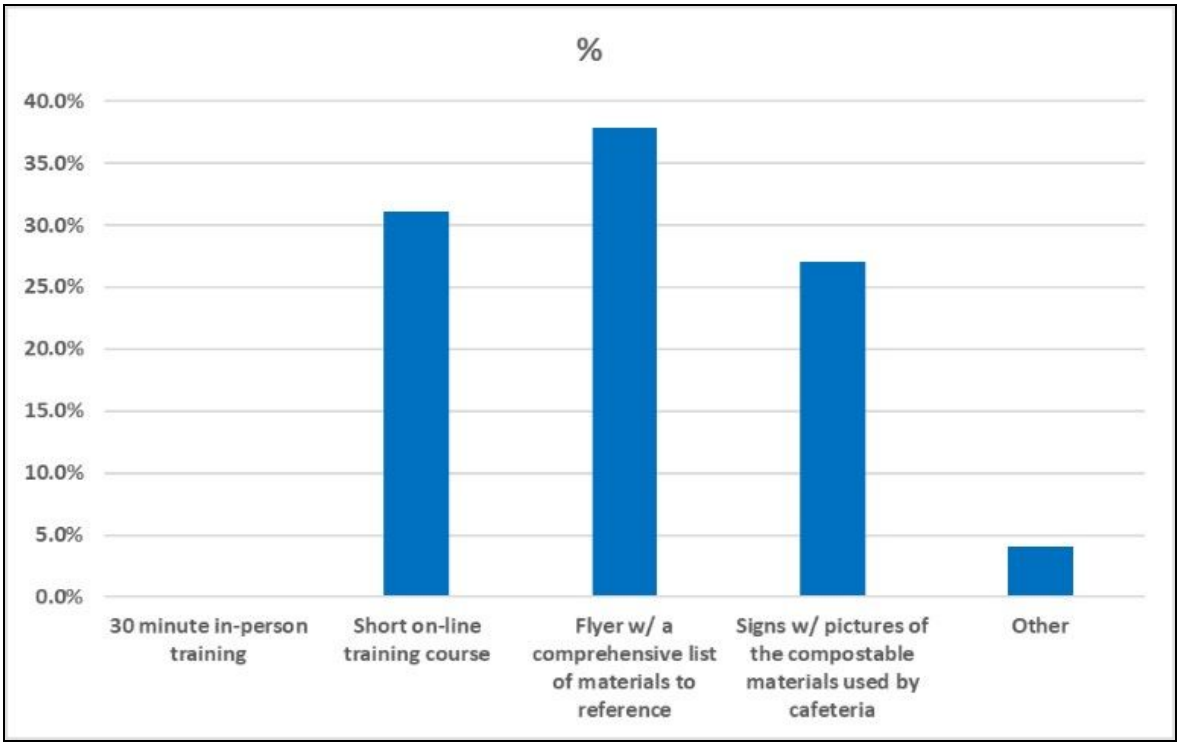
Survey Training Analysis

As stated above, signage was the only training the majority of the participants received and they mostly did not find this strongly adequate. This lack of in person may be because only half of the managerial respondents knew that Hennepin County provided in-person trainings to participating companies. **None** of the management surveyed felt that the training was strongly adequate and 42% of employees were either undecided on the trainings adequacy or disagrees that the training was adequate. This leaves a lot of room for improvement with the goal being to get participants, employees and managers, to **strongly** agree that training was adequate. Or even better, strongly agree the training was excellent.



Our survey did try to assess the level of organics recycling knowledge of both the employees and managers with our own mini-quiz to see if their training (or lack of training) was adequate or not. The majority could correctly identify what could go into the compost bins but there was some difficulty in the items that should not go in the compost bins. The main culprits that seemed to create the most confusion were milk/juice cartons and coffee cups. However, we did not clarify what kind of coffee cup though, so depending on what their particular cafeteria provided, they may or may not have that one right.

As to how the employees would most like to receive their future trainings, none of the 74 participants chose in-person trainings. This is an important note, that will be addressed in the recommendations section. The majority of participants would like a flyer with a comprehensive list, with online training coming in second as the preferred method of training.



Lack of User Motivation

The comment sections of the employee survey were filled with a common theme that is likely a large component of the contamination issue. While the comments often referred to “lazy people”, we feel that it would be more appropriate to say that these people are under trained and don’t find the need for recycling to be an important enough issue for them to put much thought into.

If, like people are commenting, some employees are simply throwing trash into whatever bin is closest, that’s a big problem. Because most people know that the non-compostable recycling can be sorted at the recycling facility, those people who are randomly putting their garbage into any bin may assume that the “single sort” capability also applies to organics recycling.

Recommendations

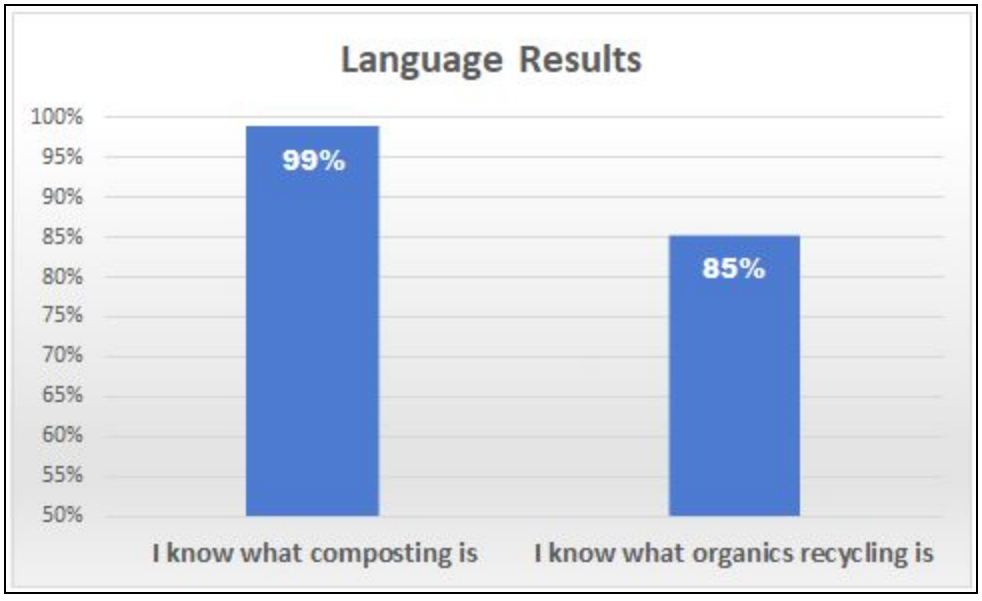
Recommendations for Hennepin County

The purpose of this study was to provide Hennepin County's Environment & Energy Department with recommendations on what they can do to help decrease contamination of the organics recycling bins distributed to commercial entities participating in the organics recycling program.

The following section will layout our recommendations, which are based on the research and analysis we have completed. While these recommendations are based on said research and analysis, they are merely the opinions of the research team and do not guarantee the desired result or do they take criteria such as the budget of the Hennepin County Environment & Energy Department into account.

Language Recommendation

The first, and easiest recommendation, for Hennepin County and the businesses attempting composting programs is about consistent messaging. Currently the terms composting and organics recycling are being used interchangeably on signage, in conversations and in handouts. The Capstone Team would like to recommend using the word "composting" consistently in messaging and signage. This recommendation is based on the survey results (as seen below), that shows the term "composting" as more recognizable, and the literature review recommendations on behavior change that show consistent messaging is key to reducing confusion and frustration.



Signage Recommendation

Signs are a great method for triggering a desired behavior and most societies use them extensively. Little research has been done on the psychology behind the question of “why” signs work so well to trigger desired response, but much research has been done to show that they actually do work (Meis J, Kashima Y, 2017). A simple stop sign for example uses a number of triggers to get the actor to behave in a certain way. First the sign is red. No matter where you are from or what language you speak, a red sign on road generally means that the desired behavior is to stop. The shape of a stop sign is another trigger and obviously the word STOP is yet another trigger.

The survey results indicated that there is definite need for clarity when it comes to the signs placed near or on the recycling bins. Signs work best as a reminder to the viewer of what to do, as opposed to actually being used to train people on what to do (Meis J, Kashima Y, 2017). Therefore it is extremely important that adequate training accompany the use signage instead of the signage being used as the training.

Organics recycling signage can give a general idea of what can be composted, users have to study the signs to determine if what they are throwing away belongs in the various recycling bins. For example, plastic vs. compostable utensils (forks, knives, spoons) and cups. At one Minneapolis restaurant, the sign on the bin shows utensils on the organics recycling sign, however the restaurant does not provide compostable utensils, only plastic. Because of the confusing sign, people are throwing non-compostable utensils in the organics bin.

Due to the confusion caused by vague signs, we strongly recommend site specific signage showing the items that are actually in use at that facility. While this will add to costs up front, we think that site specific signage would help in reducing contamination of the bins and reduce returned shipments from organics recycling facilities. There are hundreds of participating business and providing a specific sign to each of these businesses would be a huge undertaking. We recommend partnering with other agencies such as the cities of Hennepin County, NGO's and the State of Minnesota to help alleviate some of the burden.

With a larger coalition of stakeholders, better resolutions can be used. Technology plays a tremendous role in our everyday lives. Unlike even 20 years ago before anyone in the world carried a smartphone, today we are lost without one. Apps have become a tool we use in most aspects of daily living. Whether we are buying groceries, checking the weather, or playing games, we use apps to enhance our lifestyle. One way to make it easier for both the participating businesses and the administrators of recycling programs would be to design an app that allows business to take pictures of the actual compostable and/or recyclable items commonly used at their specific location. These pictures could be automatically entered into a predesigned sign template and then printed so that people recognize exactly what goes into each bin.

Communication of Statistics & Data Recommendation (Benefits, Contamination & Wins)

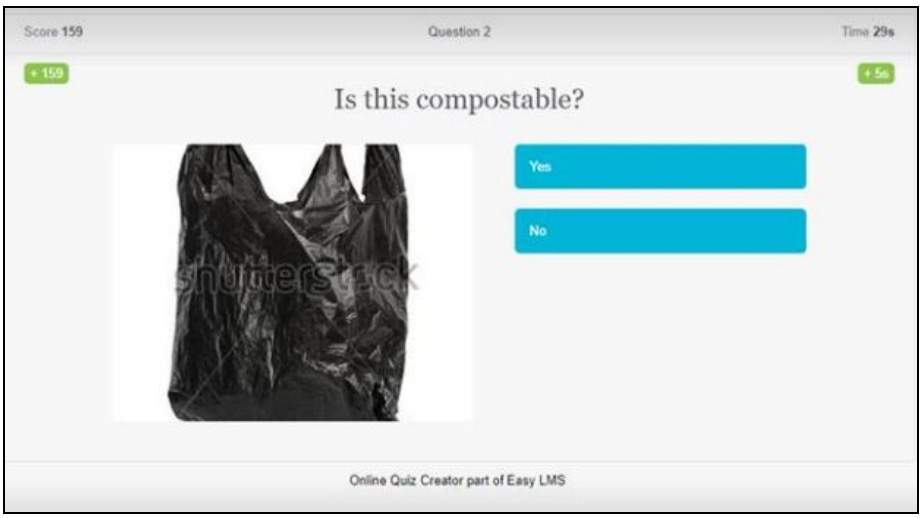
The Capstone Team heard from a number of participants in the survey, site visits, and interviews that there is a desire to be told how the program is doing, both in general and when it come to their actual location. Data such as “How much recycling has been diverted from going to the landfill?”, “How much have we recycled in tonnage?” were comments taken directly from participants surveyed. In addition, facts on how this program is important and contributes to a more sustainable lifestyle are desired by users. Contamination data could also be relayed to participants to show exactly how often contamination occurs.

Rewards are a significant motivator. Our kids react to reward, our pets react to reward , we all have more incentive to act in a desired manner when we get something out of it in return. Rewards can come in many forms, which may be both tangible and intangible. While rewards are most commonly thought of as money, a prize, or a gift, rewards can also be in the form of self gratification for accomplishing a goal. By demonstrating that a change is actually being made, buy-in will almost certainly be increased and more attention will be paid as participants are considering whether or not they should bother to participate and when they are sorting their recyclables.

The Capstone Team recommends that statistics be made available either by the county or the participating businesses on a regular basis to show how sorting correctly makes a difference as we believe this will both increase accuracy of sorting and participation rates. We also recommend that as part of any training, information be presented as to why we need to be better about recycling and how a difference can be made when we all pitch in.

Training Recommendations

The Capstone Team recommends that the County put together a suite of online training tools for the corporations to distribute to employees as they see fit. This suite could include a video of an in person training, reading material, flyer with a comprehensive list, or quizzes. This recommendation is strongly backed by the literature review and the survey results. In comparison to in-person trainings, a larger amount of people could be reached in a short amount of time, including the cleaning company staff, the material could be easily repeated or customized and rewards could be built into the quizzes to create a participation incentive.



Motivation Opportunities

The Capstone Team recommends that part of the training should include a section which discusses the negative aspects of contaminating the organics recycling bins and shows about how people are costing the business, or County, money when items are not sorted properly.

User Journey Maps and Personas

To encourage personalization of the process and deeper dive into the problem space of motivation it is recommended to incorporate a user journey map for the composted material. Maps for waste flow create a visual cue for users on how the process works and potential outcomes for choices executed, by users, in the process. In addition, user personas for individuals and companies can be used to encourage an empathetic approach to problem solving with corporations, haulers, or other stakeholders in the process. Design Thinking

courses at the Humphrey School of Public Affairs have client/case components that may be a resource to Hennepin County if they choose to engage in this process.

Public Service Campaign Recommendation

Based on site visit observations, survey results, and interviews conducted, the Capstone Team developed user personas to encourage reflection on the various individual users in the composting process. Given the variety of users in Hennepin County Corporations the Capstone Team recommends beginning a public service campaign, or Public Service Announcement (PSA) to educate the public on composting in general. Given the variety of stakeholders in the success of the composting initiative it is recommended to do a thorough analysis of possible stakeholders and bring them to the table to collaborate on a PSA campaign that is built to reach the variety of users represented by the stakeholder group.

Recap of Recommendations for Hennepin County

- Consistently use the word compost or composting instead of organics or organics recycling.
- Develop online training platforms.
- Site specific signage should show items which are currently in use at each location.
- Provide statistics, facts, and figures to corporate participants to increase buy-in of corporations and their employees.
- Create and distribute a list of recommendations to corporations to consider when forming their internal composting program.
- Part of training should include a section that discusses the adverse effect caused by reckless sorting practices.
- Engage in Design Thinking methods to develop user journey maps for compost waste, rejected compost redirected as trash, items manufactured from composted material, and user personas to better empathize with the wide variety of users of the compost system.
- Encourage stakeholders in corporations, cities and states to collaborate on a PSA campaign around composting.

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Appendix

APPENDIX A

Employee Survey

1 - Do you recycle at work?

#	Answer	%	Count
1	Always	64.85%	47.99002776936856
2	Usually	31.09%	23.00988889689578
3	Occasionally	2.70%	1.9995416644538444
4	Rarely	0.00%	0
5	Never	1.35%	1.0005416692818205
	Total	100%	74

Employee Survey Continued

2 - If you answered occasionally, rarely, or never to the previous question, why don't you always recycle at work? (Select all that apply)

#	Answer	%	Count
2	Takes too much time	2.94%	1.0002266471512404
7	Other	5.88%	1.9989121055912216
5	No one else participates	0.00%	0
8	N/A	73.52%	24.998473925071213
6	I don't believe what I put in the recycling gets recycled	11.77%	4.003475216595102
1	Don't know what to recycle	2.94%	0.9986854584399811
4	Do not know which container is for recycling.	2.94%	1.0002266471512404
3	Do not know where the recycling container is	0.00%	0
	Total	100%	34

3 - If you chose "Other" for the previous question, please type your answer below.

If you chose "Other" for the previous question, please type your answer below.

Just don't want to

4 - Do you know what composting is?

#	Answer	%	Count
1	Yes	98.65%	72.99945833071818
2	No	1.35%	1.0005416692818205
	Total	100%	74

5 - Do you know what organics recycling is?

#	Answer	%	Count
1	Yes	85.18%	63.03155554895931
2	No	14.82%	10.968444451040693
	Total	100%	74

6 - Do you understand why your workplace has decided to begin a program to sort food waste and compostable materials to be collected and composted?

#	Answer	%	Count
1	Yes	93.14%	67.9946850765363
2	No	6.86%	5.005314923463698
	Total	100%	73

Employee Survey Continued

7 - Do you participate in organics recycling for composting at work?

#	Answer	%	Count
1	Always	47.33%	35.023583327983815
2	Usually	36.45%	26.970430551872486
3	Occasionally	12.17%	9.004361112298238
4	Rarely	1.35%	1.0005416692818205
5	Never	2.70%	2.001083338563641
	Total	100%	74

8 - If you answered Occasionally, Rarely, or Never to the previous question, what is your reason? (Select all that apply)

#	Answer	%	Count
1	Don’t know what to put in compost bin	8.34%	3.0008562695748005
2	The signs are confusing	2.78%	1.0002854231916
3	There are no signs to distinguish bins	0.00%	0
4	Takes too much time	5.55%	1.9990295671074974
5	No one else participates	0.00%	0
6	Other	22.23%	8.001769605911107
7	N/A	61.11%	21.998059134214994
	Total	100%	36

9 - If you chose "Other" for the previous question, please type your answer below.

If you chose "Other" for the previous question, please type your answer below.

- Not sure what organic composting means
- Lack of convenient receptacles
- The area smells
- We do not yet have organics recycling in the building I'm in.
- There are no compost areas in my building (IC). When I am in P1 I participate.
- There is not a composting bin anywhere close to my office. When I eat in the café, I always compost what should be composted because the bins are all next to each other right by the entry ways.

10 - What materials do you think can go into the bin for composting? (Select all that apply)

#	Answer	%	Count
1	Rinds, cores, and other fruit and vegetable scraps	12.54%	73.9994268948785
2	Uneaten food	12.20%	72.00144237837266
3	Moldy or spoiled food	10.34%	60.99454149880802
4	Meat and bones	8.30%	48.98710669882041
5	Cheese, yogurt, and milk (spoiled or moldy)	9.66%	56.992405817116136
6	Cartons (that contained milk, juice, soup)	1.70%	10.008936376223692
7	Paper tea bags and coffee filters	9.67%	57.029919437642846
8	Tissues	7.96%	46.98758052014452
9	Paper towels and napkins	10.51%	61.995075419230986
10	Parchment and waxed papers	0.34%	1.9995261786758909
11	Disposable cleaning wipes	0.34%	1.9995261786758909
12	Fast food wrappers	0.34%	1.9995261786758909
13	Wooden items such as chopsticks, coffee stir sticks, and toothpicks	7.62%	44.981887752392616
14	Coffee cups	2.20%	13.003343733900435
15	Plastic feeling cups and containers that are labeled compostable	6.27%	37.01975493644152
	Total	100%	590

11 - If you do sort waste into the compost bin at work, why? (Check all that apply)

#	Answer	%	Count
1	Because I feel that it is the right thing to do	91.89%	67.99829165841888
2	Because my work mandates it	1.35%	1.0005416692818205
3	Other	2.70%	1.9995416644538444
4	N/A – I don't participate	4.06%	3.0016250078454614
	Total	100%	74

12 - If you chose "Other" for the previous question, please type your answer below.

If you chose "Other" for the previous question, please type your answer below.

- because it's so easy to do, why not?

13 - If you do sort waste into the compost bin at work, how confident are you that you do it correctly?

#	Answer	%	Count
1	Very confident	33.81%	25.017138872293962
3	Uncertain	8.11%	6.00016666747133
2	Somewhat confident	52.68%	38.980527783107426
4	Not Confident	2.70%	2.001083338563641
5	N/A – I don't participate	2.70%	2.001083338563641
	Total	100%	74.00000000000001

14 - Does your workplace offer training and educational materials on what to compost? (Select all that apply)

#	Answer	%	Count
1	In person training was provided when the program started, but not to new employees	12.20%	9.027999956369401
2	In person training was provided when the program started and is provided to all new employees	16.20%	11.987999942064286
3	Only signs and/or pamphlets	64.90%	48.02600012552738
4	An online training course	1.30%	0.9619999953508378
5	There is no training	5.40%	3.9959999806880955
	Total	100%	74

Employee Survey Continued

15 - The training I received was adequate.

#	Answer	%	Count
1	Strongly Agree	10.82%	8.004847205888067
2	Agree	47.27%	34.980930542961595
3	Undecided	25.69%	19.01080556798809
4	Disagree	14.87%	11.00441668799023
5	Strongly Disagree	1.35%	0.9989999951720239
	Total	100%	74.00000000000001

16 - If there was NO training, how did you learn about compositing? (Select all that apply)

#	Answer	%	Count
1	Signs	41.27%	25.999184752016447
2	Pamphlets	15.88%	10.003676830361591
3	Floor or Team Champions	12.70%	7.999551601694474
4	Staff newsletters	4.77%	3.002592531480153
5	Tabling outside the cafeteria	1.59%	1.00000815486275
6	Tabling for “green events” hosted on campus	3.17%	2.0000163097255
7	Other	20.63%	12.994969819859081
	Total	100%	62.99999999999999

Employee Survey Continued

17 - If you chose "Other" for the previous question, please type your answer below.

If you chose "Other" for the previous question, please type your answer below.

- compost at home
- I came into DQ knowing and practicing already.

- Through my own research and composting at home
- emails
- google search
- state fair
- N/A-- we had training course- didn't want to skip question
- I do it at home
- Previous knowledge

18 - Do you know who to ask to learn more about recycling/composting at your workplace?

#	Answer	%	Count
1	Yes	71.65%	53.02254165628801
2	No	28.35%	20.977458343711994
	Total	100%	74

19 - Is there a champion, or leader, who promotes recycling/composting at your workplace?

#	Answer	%	Count
1	Yes	80.00%	55.99743184791295
2	No	20.00%	14.002568152087052
	Total	100%	70

20 - How would you most like to learn what materials should be put in the compost bin?

#	Answer	%	Count
1	A 30 minute in-person training	0.00%	0
2	A short online training course	31.05%	22.98059720801893
3	A flyer with a comprehensive list of materials to reference	37.86%	28.019277791377572
4	Signs with pictures of the compostable materials used by our cafeteria	27.03%	20.000041666867833
5	Other	4.05%	3.000083333735665
	Total	100%	74

21 - If you chose "Other" for the previous question, please type your answer below.

If you chose "Other" for the previous question, please type your answer below.

- LSM Training Module
- I think we need a combination of signage and in person training. No one will do online training. And we have some signage and people still ignore what is on there.
- NA

22 - Please tell us what you think has worked well for composting at your workplace.

- The bins on each floor are easily accessible.
- The composting bins located on floors in multiple locations.
- We generate a lot of food waste, so it is very good to capture this as compost rather than solid waste.
- Food waste in the lab
- making it so easy!
- Having containers!
- There are signs that have examples of what goes in each bin.
- Signage at all three bins
- Signage with list
- Having the bins readily available
- Changing all to-go containers from the cafes helps a lot on the green program
- Continual and simple messaging
- Signage near all waste and recycling receptacles, informative adverts on the tvs, and having green team members showing people what to do when the program started.
- Having sorting done at the source.
- NA

Employee Survey Continued

- **Making it easy - ie: everything from cafeterias is compostable.**
- **Making it simple for people. Having the ability to say "all containers from the cafeteria are compostable" eliminates people having to think about it.**
- **More awareness over the past year or two has been helpful.**
- **separate bins for trash, recycling and composting that have pictures of what is okay to put in which bin**
- **Continual communication and signage**
- **Participation and diversion are increasing, as the program expands with more bins and to more locations.**
- **signage**

23 - Please tell us what is not working well or what you think may be the cause of contamination to compost bins.

- Lazy people
- Careless individuals.
- People don't care enough to pay attention. :(
- The employee understanding or desire to recycle/compost vs just throwing everything in the garbage all the time. I would eliminate garbage cans at employee desks and require employees to keep a clean space and recycle/compost often.
- The bins used for composting in the lab are not a good choice. The bags fall off the sides and down into the bin. The bins are so large that if you even half fill them, they are too heavy to dump. These should be replaced by something like 5 gallon pails on dollies that hold 2 or more pails at a time. Full pails are light enough to move by hand and the dollies allow several to be accessed at a time. Better tools will greatly increase compliance.
- What is meant by contamination? Not sure what you are asking, but ongoing training is essential. The other thing needed is more bins located around the building. It is a pain to have to walk down a hall during a busy day to throw away a banana peel. I keep a trash bag at my desk that most of the time I sort when I do throw things away. Use the Nudge Theory to get people more engaged!!
- Not having a garbage can at desks, only recycle bin is at desk
- still not quite sure what I can and can't put in. If I am questioning an item, I will just throw it in the trash instead
- Getting other people to care. I find myself digging stuff out at home and now work because I cannot morally let it go. I'd really rather not touch other people's food stuff but will if I have to.

Employee Survey Continued

23 (Continued)

- Quite honestly, I'm not sure there are enough people that actually care about it. So they toss stuff in the trash and don't want to take the time to recycle.
- People who don't care and just dump in any they want
- the people who don't care
- Composting is not working well at all. It isn't convenient so most people don't bother, and just throw everything (trash, compost, recycling) in their recycling bin at their desk. I see a lot of cross contamination mainly by the coffee machines as there is only a compost bin by the coffee machines, which means people throw everything in there because it isn't convenient to walk halfway down the building for the trash/recycling bins. And most people don't really know what to put in the compost, so I'll see the plastic-coated cups and coffee cups in the compost all the time. People don't necessarily read the signs.
- People being irresponsible and careless. Having more detail at the bins on what can be composted would help.
- Lack of attention prior to placing items in the proper bins.
- People not educated and throw thing in the wrong bin
- People don't pay attention to the color of the bins. They throw everything into the first bin they see. The bins themselves needs to be different to remind people that each bin serves a different function.
- Lock of information or training, awareness of the importance of the impact on our community as in our world "If you do not recycle at home you do not recycle at work"
- Those who are unsure but believe it to be compostable

- Lack of trash containers near all spots that have a compost bin. Not all, but many people are unfortunately lazy by default, and don't want to search for a trash bin for a non compostable/recyclable item, and will just throw it in whatever is closer.
- Poor attitude by those who just don't care.
- NA
- People thinking it's better to put it in the bin when they're not sure instead of throwing it away.
- Lack of caring/support. Not understanding there are consequences when bins are contaminated. Uncertainty about what is compostable/recyclable.
- People still don't seem to do it right, even though there are clear signs on the bins. I think people are just lazy and/or don't see the point of it.
- Sometimes I'm unsure where something might go if it's not one of the pics on the bin. Really need it all "dumbed down" and all-inclusive so that you don't have to think about it so hard
- I'm not sure how to get people to care about the planet. Some will not participate in any recycling or composting because they just don't care enough about it. Also, there is great info on what to recycle and compost but not the reason why we should recycle and compost.
- Contamination sometimes looks like people just throw everything the have into one bin. It might be Organics, R/C, or waste bin. I'm not sure how you can ever get those folks to care.
- people not paying attention to where they are putting things.

APPENDIX B

Management Survey

1 - Do you recycle at work?

#	Answer	%	Count
1	Always	70.00%	7
2	Usually	30.00%	3
3	Occasionally	0.00%	0
4	Rarely	0.00%	0
5	Never	0.00%	0
	Total	100%	10

2 - If you answered Occasionally, Rarely, or Never to the previous question, why don't you always recycle at work? (Select all that apply)

#	Answer	%	Count
1	Don't know what to recycle.	0.00%	0
2	Takes too much time.	0.00%	0
3	Do not know where the recycling container is.	0.00%	0
4	Do not know which container is for recycling.	0.00%	0
5	No one else participates.	0.00%	0
6	I don't believe what I put in the recycling gets recycled.	0.00%	0
7	Other	0.00%	0
8	N/A	100.00%	2
	Total	100%	2

3 - If you chose "Other" for the previous question, please type your answer below.

If you chose "Other" for the previous question, please type your answer below.

4 - What do you think participation rate is for employees?

#	Answer	%	Count
1	Close to no participation	0.00%	0
2	25%	30.00%	3
3	50%	60.00%	6
4	75%	0.00%	0
5	All or nearly all employees participate	10.00%	1
	Total	100%	10

Management Survey Continued

5 - If your participation rate is over 50% of your staff, what are you doing to achieve this level of participation?

If your participation rate is over 50% of your staff, what are you doing to achieve this level of participation?

· We require our employees sort their own trash by eliminating trash disposal at their desks, on each floor created central disposal locations for compost, recycling, and trash, 98% of the to-go and internal catered items used in are compostable, we do timely and targeted communications with our internal communications team to remind employees how to dispose of items properly.

· Continue to talk about recycling with anyone that will listen!

Management Survey Continued

6 - If your participation rate is below 50%, why do you think some employees are choosing not to participate?

If your participation rate is below 50%, why do you think some employees are choosing not to participate?
· ease of placing items in deskside collection (landfill/paper recycling provided at deskside), people don't want to walk to central breakroom/workrooms for compost collection.
· they don't care
· Continue to talk about recycling with anyone that will listen!
· Don't want to take the time to remove packaging material. Don't believe in the importance of it. Believe it will still get tossed in with the regular trash at the end. Messy/smelly Attracting bugs/rodents
· Laziness
· Lack of knowledge on what can be recycled/composted Lazy Rushed Not a priority
· We do not have organics at all of our facilities. Once that is added to the other 2 large buildings on campus we should see higher participation.

Management Survey Continued

7 - How confident are you that you compost correctly?

#	Answer	%	Count
1	Very Confident	60.00%	6
2	Somewhat Confident	40.00%	4
3	Uncertain	0.00%	0
4	Not Confident	0.00%	0
5	N/A - I don’t participate	0.00%	0
	Total	100%	10

Management Survey Continued

8 - How confident are you that employees compost correctly?

#	Answer	%	Count
1	Very Confident	0.00%	0
2	Somewhat Confident	50.00%	5
3	Uncertain	30.00%	3
4	Not Confident	20.00%	2
	Total	100%	10

Management Survey Continued

9 - What materials do you think can go into the bin for composting? (Select all that apply)

#	Answer	%	Count
1	Rinds, cores, and other fruit and vegetable scraps	11.11%	10
2	Uneaten food	11.11%	10
3	Moldy or spoiled food	8.89%	8
4	Meat and bones	6.67%	6
5	Cheese, yogurt, and milk (spoiled and moldy)	7.78%	7
6	Cartons (that contained milk, juice, soup)	1.11%	1
7	Paper tea bags and coffee filters	10.00%	9
8	Tissues	11.11%	10
9	Paper towels and napkins	11.11%	10
10	Parchment and waxed papers	0.00%	0
11	Disposable cleaning wipes	0.00%	0
12	Fast food wrappers	1.11%	1
13	Wooden items such as chopsticks, coffee stir sticks, and toothpicks	10.00%	9
14	Coffee cups	1.11%	1
15	Plastic feeling cups and containers that are labeled compostable	8.89%	8
	Total	100%	90

10 - Does your workplace offer training and educational materials on what to compost? (Select all that apply)

#	Answer	%	Count
1	In person training was provided when the program started, but not to new employees	33.33%	6
2	In person training was provided when the program started and is provided to all new employees	5.56%	1
3	Signs and/or pamphlets	55.56%	10
4	An online training course	0.00%	0
5	There is no training and there never has been	5.56%	1
	Total	100%	18

11 - If your workplace offers training is it mandatory or opt-in for staff?

#	Answer	%	Count
1	Mandatory for all staff	0.00%	0
2	Opt-in for all staff	20.00%	2
3	N/A	80.00%	8
	Total	100%	10

12 - I feel that the training offered is adequate.

#	Answer	%	Count
1	Strongly Agree	0.00%	0
2	Agree	22.22%	2
3	Undecided	22.22%	2
4	Disagree	33.33%	3
5	Strongly Disagree	22.22%	2
6	N/A - No training was offered	0.00%	0
	Total	100%	9

13 - If there was NO training, how did you provide the rules for composting to staff? (Select all that apply)

#	Answer	%	Count
1	Signs	37.50%	6
2	Pamphlets	12.50%	2
3	Floor or Team Champions	12.50%	2
4	Staff newsletters	6.25%	1
5	Tabling outside the cafeteria	12.50%	2
6	Tabling for “green events” hosted on campus	18.75%	3
	Total	100%	16

14 - If you selected staff newsletter, chose all that apply.

#	Answer	%	Count
1	It is an opt in “Green Tips” newsletter	20.00%	1
2	It is sent to all staff	40.00%	2
3	It goes out at least twice a year	20.00%	1
4	It went out once when we started	0.00%	0
5	N/A	20.00%	1
	Total	100%	5

15 - Did you know that Hennepin County offers training to businesses who participate in organics recycling programs (composting and food to animal) upon request?

#	Answer	%	Count
1	Yes, I am aware of that	55.56%	5
2	No, I was not aware of that	44.44%	4
	Total	100%	9

16 - Now that you are aware, how likely are you to utilize Hennepin County staff for training?

#	Answer	%	Count
1	Very likely	11.11%	1
2	Likely	22.22%	2
3	Undecided	66.67%	6
4	Unlikely	0.00%	0
5	Very unlikely, we don’t need training	0.00%	0
6	Very unlikely, we don’t want training	0.00%	0
	Total	100%	9

17 - Does your business promote employee participation?

#	Answer	%	Count
1	Yes	77.78%	7
2	No	22.22%	2
	Total	100%	9

18 - Do you have any insight, or ideas, about what may be the main sources of contamination to organics recycling bins?

Do you have any insight, or ideas, about what may be the main sources of contamination to organics recycling bins?

- Food packaging that is non-compostable Straws/plastic stir sticks
- Employee laziness/uncertainty on disposing of trash and employees thinking they are throwing it in the right container but they are not.
- It is confusing when it goes beyond food as to what goes into the bin.
- Laziness
- We have a lot of "paper" cups but they are coated, so they cannot be recycled and that is a common misconception.

19 - Make any additional comments you feel would shed light on some best practices Hennepin County could adopt to make the program easier for businesses and their employees to confidently participate in.

Make any additional comments you feel would shed light on some best practices Hennepin County could adopt to make the program easier for businesses and their employees to confidently participate in.

· Consistent signage with actual examples of common wastes on property helps provide clarity

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· Metrics is critical to understanding how well you are doing. Waste haulers in the Twin Cities are slowly adapting to scales on all trucks and this needs to be adopted at a higher rate. Try getting a good grasp of what is coming into the building or property. You need to try and understand what kind of waste you are producing to get the right containers

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· Sharing the facts/data such as DQ has reduced the amount of garbage by 25% from Jan 2015-Jan 2017 since composting first started. (or whatever the numbers are) How the facts correlate to cost savings for the company such as since DQ has started composting, the trash service pick-up has decreased from $500/month to $400/month (or whatever the dollar amounts are)